

PRISCILEO ROSKELLYAE SP. NOV. (THYLACOLEONIDAE, MARSUPIALIA) FROM THE OLIGOCENE-MIOCENE OF RIVERSLEIGH, NORTHWESTERN QUEENSLAND

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Gillespie, A., 1997 06 30. *Priscileo roskellyae* sp. nov. (Thylacoleonidae, Marsupialia) from the Oligocene-Miocene of Riversleigh, northwestern Queensland. *Memoirs of the Queensland Museum* **41**(2): 321-327. Brisbane. ISSN 0079-8835.

Upper dentition of the marsupial lion *Priscileo roskellyae* sp. nov. from the Upper Site Local Fauna of Riversleigh provides the first detailed information about upper dentition of the genus. The upper adult dental formula is I1-3, C1, P1-3, M1-4. This species is smaller than *P. pitikantensis* and is the most plesiomorphic thylacoleonid. Relative to *Wakaleo*, P3 is less bowed and molars are square and have a metaconule at their posterior margin. □*Thylacoleonidae, Wakaleoninae, Priscileo, Riversleigh, Oligocene, Miocene.*

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The marsupial lion genus *Priscileo* Rauscher, 1987 contains only *P. pitikantensis* Rauscher, 1987, from the late Oligocene Ngapakaldi Local Fauna, S. Aust which is known only from a maxillary fragment, a few teeth, and a number of post cranial elements. Additional *Priscileo* material has been recovered from the Oligocene-Miocene of Riversleigh, northwestern Queensland. This material includes a near complete skull from the Upper Site Local Fauna representing *Priscileo roskellyae* sp. nov.

Dental terminology for molars and the last premolar follows Lockett (1993) who has shown that a molariform dP3 (M1 of Archer, 1978) in marsupials is replaced by P3. Accordingly, the remaining molars represent M1-4. However, homology of the other premolars follows Flower (1867). Material is housed in the Commonwealth Palaeontological Collection, Bureau of Mineral Resources, Canberra (CPC), Northern Territory Museum (NTM), Queensland Museum (QMF), South Australian Museum (SAMP), Museum of Palaeontology, University of California, Berkeley (UCMPB).

SYSTEMATICS

Superorder MARSUPIALIA Illiger, 1811
Order DIPROTODONTIA Owen, 1866
Family THYLACOLEONIDAE Gill, 1872

***Priscileo* Rauscher, 1987**

TYPE SPECIES. *Priscileo pitikantensis* Rauscher, 1987.

DIAGNOSIS. Small; P3 length usually less than 12mm; M1 and M2 relatively square in basal

outline, with a posterolingual metaconule; anterior root of the zygomatic arch projecting anterolaterally dorsal to M2-3.

***Priscileo roskellyae* sp. nov.**
(Figs 1-3)

MATERIAL. Holotype QMF23453, a skull with left and right P3, M1-2, alveoli for left and right I2-3, C1, P1-2, M3-4, and partial alveoli for the left and right I1 from early Miocene Upper Site, Godthelp Hill, Riversleigh.

ETYMOLOGY. For the former Australian Minister of Arts, Sport, the Environment, Tourism and Territories, the Hon. Ros Kelly, who provided significant support for the Riversleigh Project.

DIAGNOSIS (by comparison with the type and only other species). Smaller; P3 approximately 2/3 as long; metaconule on M1 and M2; alveolus of P1 closer to the P2 alveolus than to the canine alveolus; lingual root on M1 smaller, not intruding as far medially into the palate.

DESCRIPTION. Upper dentition. Formula I1-3, C1, P1-3, M1-4. Alveoli for I1 large and incomplete. Alveolus for I2 smallest of incisor alveoli. Alveolus for C1 ovoid, larger than alveolus for I3, smaller than that for I1. Canine alveolus closer to I3 alveolus than to P1 alveolus. Two small alveoli for two single-rooted premolars between the canine and P3. C1 and P1 alveoli separated by an approximately 3 mm. P2 alveolus close behind that for P1, abutting the anterior base of P3.

P3. As in *Wakaleo* but 25-66% smaller. Posterior portion only slightly broader than the anterior

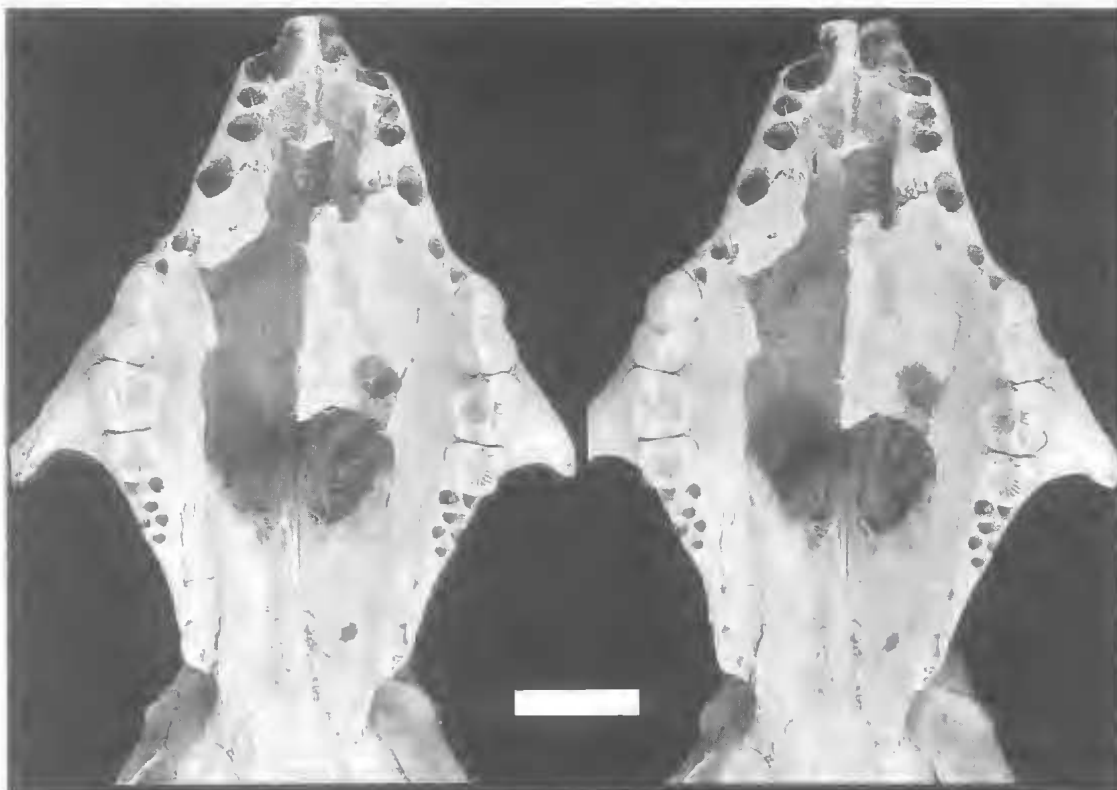


FIG. 1. *Priscileo roskellyae* sp. nov., holotype, QMF23453, partial skull, from Upper Site, Godthelp Hill, Riversleigh. Ventral view stereopair, showing upper dentition.

portion (unlike *Wakaleo* where the posterior is much broader). Longitudinal blade slightly inwardly-curved in contrast to the distinctive inwardly-curved blade of most *Wakaleo*. Relatively uniform width with gently curved longitudinal blade giving P3 rectangular shape. Longitudinal blade running between 2 major cusps. In buccal view, the shearing blade of P3 W-shaped, the longitudinal blade forming the rise in the middle, and the anterior and posterior blades ascending from the major cusps at each end. The anterior cusp is slightly higher than the posterior (as in *W. alcootaensis*). In *W. vanderleueri* the cusps are approximately equal in height. Three vertical blades, one anterior, one lingual, and one buccal, ascending from the anterior cusp to the base of the crown. Anterior blade curving lingually as it ascends, bending slightly posteriorly before merging with the base of the crown. Lingual curvature of blade producing a small vertical lip towards the base of the blade. Similar lip in some Riversleigh *Wakaleo*. Posterior to this blade lingual face of the crown curving concavely forming an anterolingual basin. Lingual blade

curving slightly anteriorly as it ascends and merges with the base of the crown. Many *T. carnifex* and *T. crassidentatus* also with lingual blade in contrast to *W. alcootaensis* and *W. vanderleueri* in which it is absent. Posterior to the lingual blade the lingual flank of P3 forming a sharp depression extending from the base to the crown. Lingual flank following the curve of the posterior root, curving convexly to the posterior border. Buccal blade of the anterior cusp ascending in a slight posterior direction, merging with the crown midway up the tooth. Short buccal blade also ascending from the posterior cusp, merging with the crown midway up the tooth, not as prominent as the anterior buccal blade. Similar anterior and posterior buccal blades in *Wakaleo*. Posterior blade running posterolaterally from the posterior cusp to the posterior margin of the tooth, an extension of the longitudinal blade, contiguous with the preparacrista of M1, in P3 of *Wakaleo* but absent in *Thylacoleo*. Short oblique blade at termination of posterior blade at the posterior margin of P3, ascending anterolaterally on the buccal flank, merging midway with the base of

TABLE 1. Dimensions of upper cheek teeth of species of *Priscileo* and *Wakaleo*. Data from Clemens & Plane (1974), Archer & Rich (1982), Rauscher (1987) and Murray & Megirian (1990). Measurements for *P. pitikantensis* (except P3) were taken from from a caste of UCMP88448. a=alveolus measurement.

	Length (mm)					
	P3	M1	M2	M3	M4	P3/M1
<i>P. roskellyae</i>						
QMF23453	8.2	5.8	4.3	3.3a	2.9a	1.41
<i>P. pitikantensis</i>						
UCMP88448	11.0a	6.5a	5.3	3.7a	3.5a	1.69
<i>W. alcootaensis</i>						
NTM P1	23.3	14.7	7.2	?	-	1.58
<i>W. vanderleuerei</i>						
CPC26604	17.9	11.2	7.0	5.0	-	1.59
Riversleigh <i>Wakaleo</i>						
QMF24680	12.9a	8.9a	6.3	4.9a	4.3a	1.44
QMF23446	12.6	9.6	6.0	5.2	-	1.31
QMF23443	12.2	9.4	6.0	4.5	3.5a	1.30

the crown, lacking in *Thylacoleo* and *W. alcootaensis*. *W. vanderleuerei* with a small blade in a similar position, differing by commencing a short distance before the end of the posterior blade, more vertically oriented. On the buccal flank of P3, a broad valley running between the anterior and posterior buccal blades, much broader, in *Wakaleo*.

Molars. Left and right M1 and M2 relatively unworn. Alveoli for M3 and M4 indicating 3 roots for each; 2 equal anterior roots, with slightly larger posterior one. In *Wakaleo vanderleuerei* anterior roots of M3 larger. Molar gradient steep, similar to *P. pitikantensis* and *Wakaleo*. M1 and M2 square, unlike the triangular molars in *Wakaleo*. Molar morphology similar to *Wakaleo*. M1 wider anteriorly than posteriorly. Paracone highest cusp. Small blade ascending anteriorly from the paracone to the anterior edge, joining stylar cusp B, contiguous with blade ascending from the posterior cusp of P3. Postparaecrista running posteriorly, meeting the ascending premetacrista, forming a notch midway along the straight centrocrista. Metacone well-developed. Postmetacrista ascending posteriorly from the metacone to the posterior margin of M1. Buttressing the steep lingual face of the paracone a short crescent-shaped preparaconulecrista straightening medially, terminating at a paraconule. Short postparaconulecrista running posteriorly into the

trigon basin. *W. vanderleuerei* and Riversleigh *Wakaleo* with much straighter and longer blade ascending lingually from the paracone. Preprotocrista arising from the anterior edge of the trigon basin medial to the paraconule, running posteromedially to the protocone. From the protocone a postprotocrista running posteriorly to a metaconule. Postmetaconulecrista curving posterolaterally from the metaconule, ascending to merge with the posterior margin of the postmetacrista. Short crescent-shaped ridge ascending lingual face of metacone, terminating midway between metacone and metaconule. M1 of *W. vanderleuerei* and Riversleigh *Wakaleo* with similar ridge. Blades joining the 4 major cusps forming margins of a deep, square trigon basin. Within the basin, fine enamel crenulations radiate outwards. Similar crenulated trigon basins occur in *Wakaleo* and *T. crassidentatus*. Buccal flank of M1, especially anteriorly, swollen resulting in a broad base for the stylar shelf. A stylar basin running from the posterobuccal face of the paracone to the posterobuccal margin of the metacone, becoming shallower posteriorly. Lateral wall of the basin lined with small vertical ridges.

M2. M2 smaller than M1, lacking the distinctive broad stylar shelf and basin. Paracone highest cusp, more lateral than in M1. Short, semicircular preparaecrista running anteromedially from the paracone. Small ridge buttressing lingual base of the paracone. Medial to this ridge a preprotocrista arising, running posteromedially to the protocone. Protocone prominent, more anteriorly placed than in M1. Protocone lingually bulbous as in *P. pitikantensis* and *Wakaleo*. A narrow anterior shelf running from the base of the preparaecrista to the protocone. Postprotocrista running posterobuccally to a gently-rounded, posterior metaconule, producing squaring of the lingual outline. No metaconule on M2 of *P. pitikantensis* but could be lost by damage to rear portion of the tooth. Short postmetaconulecrista running posterolaterally, merging with the posterior margin of the tooth. Metacone rounded and more posteriorly situated than in M1, with lingual blade running medially, connecting with a small blade running laterally from the metaconule, forming anterior border of a small, oval, basin at the posterior. Postparaecrista running posterolaterally to the buccal margin of the stylar shell, converging with anterolaterally orientated premetacrista. Deep, square, trigon basin between the major cusps with fine enamel crenula-

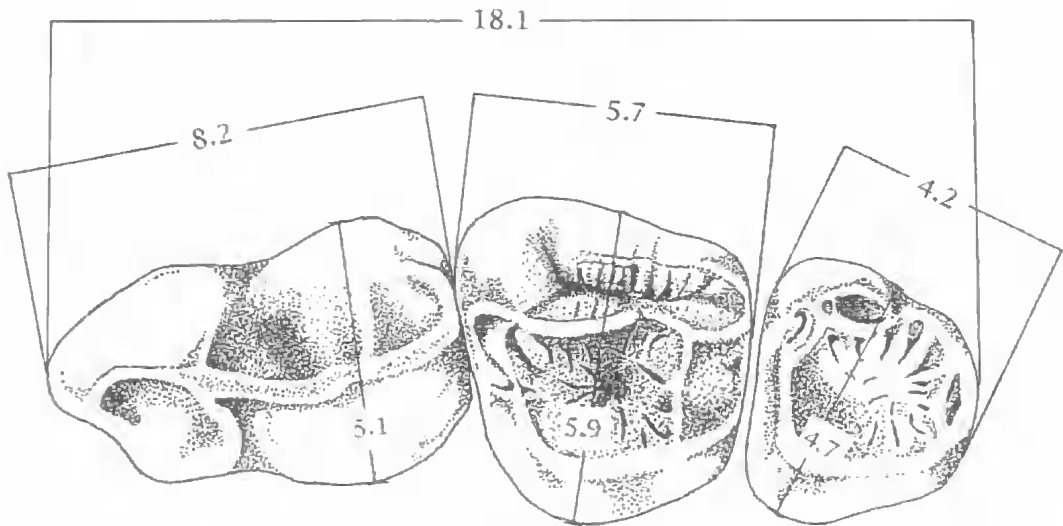


FIG. 2. *Priscileo roskellyae* sp. nov., holotype, QMF23453, measurements (mm) of left tooth row. P³ on left, M¹ and M².

tions concentrated on the lateral and posterior walls. Crenulated basins in M2 of *P. pitikantensis* and *Wakaleo*. On the buccal margin of M2 a small, elongate, styler basin parallel to the postparacrista, terminating midway between the paracone and metacone. Similar basin in Riversleigh *Wakaleo*, difficult to discern in the heavily worn M2 of *W. vanderteueri*.

COMPARISON. *P. roskellyae* differs from all species of *Wakaleo* in: being smaller; the P3 of *P. roskellyae* is approximately 1/3 length of P3 of *W. alcootaensis*, 1/2 the length of P3 of *W. vanderteueri*, and 2/3 the length of P3s of Riversleigh *Wakaleo*; having a lingual crest ascend from the anterior eusp of P3; having the shearing blade of P3 straighter; having the posterior root of P3 only slightly enlarged; having the posterior half of P3 relatively square in basal outline; having M1 and M2 relatively square in basal outline. *P. roskellyae* differs from *Thylacoleo* in: being smaller; P3 being approximately 1/3 length of P3 of *T. hilli* and 1/6 length of P3 of *T. carnifex*; having M3+4; having M1+2 relatively square in basal outline.

DISCUSSION

The diagnosis of *Priscileo* is amended to include *P. roskellyae*. Rauscher (1987) distinguished *Priscileo* from other thylacoleonids by M4, a P3/M1 length ratio less than 1.70, and M2 with a

crenulate, anteroposteriorly broad trigon basin. Some of the new Riversleigh *Wakaleo* specimens have these features. Two *Wakaleo* specimens have an M4 (Table 1), and most have a relatively broad crenulated basin on M2. All species of *Wakaleo* have a P3/M1 ratio of less than 1.70. The value for *P. roskellyae* (1.41) falls midway within this range.

Rauscher (1987) distinguished *Priscileo* from *Wakaleo* by the loss of P1 or 2 and M4 in the latter. Although some new Riversleigh *Wakaleo* specimens have these teeth, the plesiomorphic features of *P. roskellyae* exhibits (significantly smaller size, square molar shape, metaconule and relatively straight cutting blade on P3) require generic distinction. *P. pitikantensis* and *P. roskellyae* share generic features of dental dimensions, shape of M2 and position of the anterior base of the zygomatic arch. Specific distinction of *P. roskellyae* is based on the size difference between these two species, *P. pitikantensis* being 33% larger.

INTRAFAMILIAL RELATIONSHIPS

Rauscher (1987) found no synapomorphies uniting *Priscileo* and *Wakaleo*, or uniting *Priscileo* and *Thylacoleo*. Analysis of *Priscileo* and *Thylacoleo* included comparison of postcranial material and for a number of character-states, *Thylacoleo* exhibited the plesiomorphic condition while *Priscileo* was derived. Rauscher con-

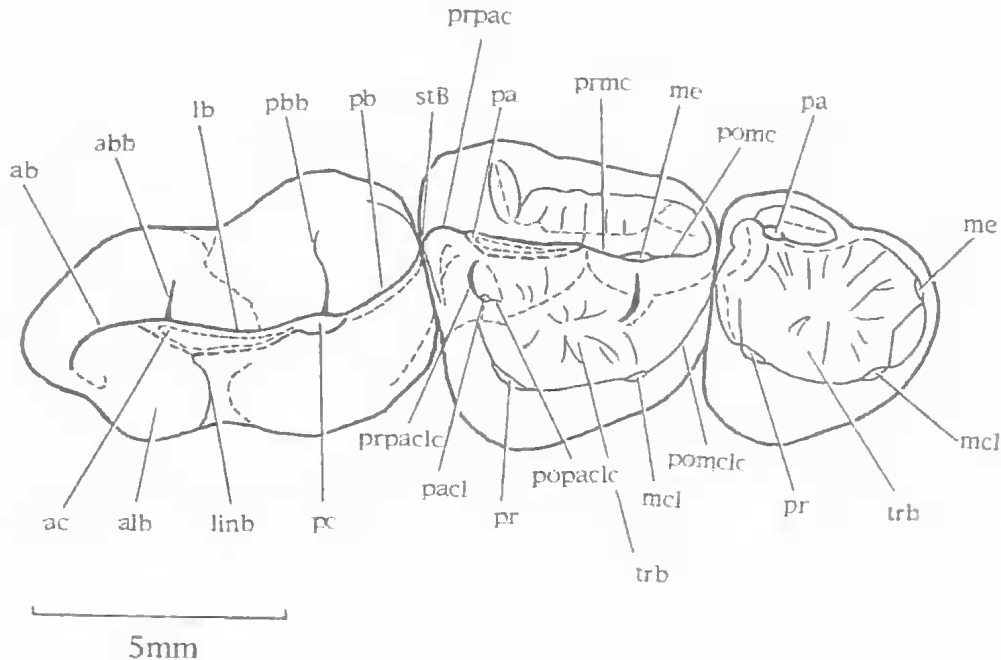


FIG. 3. *Priscileo roskellyae* sp. nov., holotype, QMF23453, left cheek dentition. lb=longitudinal blade; ab=anterior blade; pb=posterior blade; ac=anterior cusp; pc=posterior cusp; abb=anterior buccal blade; linb=lingual blade; pbb=posterior buccal blade; alb=anterior lingual basin; pa=paracone; pacl=paraconule; prpac=preparaconule; popac=postparaconulecrista; prpac=preparaconulecrista; popac=postparaconulecrista; pr=protocone; mcl=metaconule; pomcl=postmetaconulecrista; me=metacone; pome=postmetaacrista; prmc=premetaacrista; stB=stylar cusp B; trb=trigone basin.

cluded that *Thylacoleo*'s primitive features were secondarily derived and not a retained plesiomorphic condition. Because *Wakaleo* and *Thylacoleo* share the synapomorphy of loss of M4, Rauscher (1987) considered them to be sister groups. *Priscileo* was regarded as the sister group of a *Wakaleo/Thylacoleo* clade.

Rauscher (1987) suggested that loss of the metaconule could be a diagnostic feature for the Thylacoleonidae based on the tritubercular upper molars of *Wakaleo* and *Priscileo* and the secondarily quadritubercular M1 of *Thylacoleo*. However, M1 and M2 of *P. roskellyae* have a metaconule and are basically square in outline. The metaconule on these molars, especially on M2, is posteriorly positioned and its seeming absence from M2 of *P. pitkantensis* may be a result of damage which is evident at the rear margin of this tooth. Consequently, loss of the metaconule can no longer be considered a synapomorphy for the family.

Murray et al. (1987) placed *Wakaleo* and *Thylacoleo* in separate subfamilies: the Wakaleoninae includes *Wakaleo*; and the

Thylacoleoninae which includes *Thylacoleo* and possibly *Priscileo*. Wakaleonines were regarded to differ from thylacoleonines in absence of P1 and formation of a tympanic wing composed of alisphenoid and squamosal contributions. Features distinguishing thylacoleonines from wakaleonines include P1, squamosal contribution to the tympanic wing and frontal-squamosal contact on the lateral cranial wall. The new thylacoleonid specimens from Riversleigh indicate that, in terms of dental morphology, *Priscileo* exhibits no features that prevent it from being ancestral to *Wakaleo* and *Thylacoleo*. The dental features of *Priscileo*, including small P3 and molar size, square (nearly bunodont) molar shape, metaconule, and full premolar and molar complement are almost certainly plesiomorphic features within the family.

However, these same features clarify some questions about relationships of the family with the Order Diprotodontia. It was once commonly believed that thylacoleonids evolved from a phalangerid-like diprotodontian which had quadritubercular upper molars including a hyper-

trophied metaconule (Krefft, 1872; Broom, 1898; Bensley, 1903; Ride, 1964; Archer, 1976). Archer & Rich (1982) hypothesised that the tritubercular shape of the molars of *W. alchootaensis* were secondarily derived from an ancestral quadritubercular shape through suppression of the metaconule. It has been suggested that the triangular molars of *Wakaleo* are plesiomorphic for the family (Murray et al., 1987). The primitive dental features of *P. roskellyae*, especially the metaconule and square molar shape, provide support for Archer & Rich (1982).

Priscileo and *Wakaleo* have been collected from Riversleigh's System B sites indicating overlapping of early Miocene thylacoleonid lineages. Temporal overlapping of species of *Thylacoleo* (*T. crassidentatus* and *T. hilli*) also occurred in the early Pliocene (Archer & Dawson, 1982). In each case there was a distinct size difference in the lineages involved. In terms of P3 length, System B specimens of *Wakaleo* are approximately 1.5 times larger than *P. roskellyae*. Similarly, P3 of *T. crassidentatus* is twice the length of that tooth in *T. hilli* (Pledge, 1977). It is possible that size differences of this magnitude among sympatric thylacoleonids were an important factor in reducing competition. Morphological studies of the limbs of *P. pitikantensis* suggest it was arboreal (Rauscher, 1987). *Wakaleo*, being larger and no doubt heavier, may have been more terrestrial. Murray & Megirian (1990) also intimated a terrestrial existence for *Wakaleo* based on the wrist joint and heavily-worn dentition which they consider may indicate a scavenging mode of life.

ACKNOWLEDGEMENTS

I thank Michael Archer and Henk Godthelp for constructive comments and Stephan Williams, Karen Black and Jenni Brammall for assistance with photography. Support for research at Riversleigh has come from the Australian Research Grant Scheme; the National Estate Grants Scheme (Queensland); the University of New South Wales; the Commonwealth Department of Environment, Sports, and Territories; the Queensland National Parks and Wildlife Service; the Commonwealth Heritage Unit; ICI Australia; the Australian Geographic Society; the Queensland Museum; the Australian Museum; the Royal Zoological Society of NSW; the Linnean Society of NSW; Century Zinc; Mount Isa Mines; Surrey Beatty & Sons; the Riversleigh Society; and private supporters including Elaine Clark, Margaret

Beavis, Martin Dickson, Sue & Jim Lavarack and Sue & Don Scott-Orr. Invaluable assistance in the field has come from numerous volunteers, staff and postgraduate students of the University of New South Wales.

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